BRYSTON

9BSST

POWER AMPLIFIER
OWNER'S MANUAL

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Introduction

Thank you for choosing the **9BSST Five Channel Power Amplifier**.
Bryston welcomes any suggestions you may have, or comments regarding the operation of your amplifier. We consider you, our customer, to be Bryston's most important resource, and your opinion is very much appreciated.

Description

The **9BSST** is a modular design 5 x 120 Watts per channel audio power amplifier. Each channel selects a balanced or single ended input. Each channel selects a gain of 29dB(1v), 23dB(2v) or 17dB(4v). Each channel input may be operated inverted or non-inverted operation (0 or -180 degrees). The power up of the 9BSST may be controlled by a remote control voltage. The 9BSST includes 'soft start' power control circuitry to eliminate high inrush currents when A/C power is applied.

Warranty (see back page for details)

Shipping Box & Packing Material

Please keep the original shipping box and all packing material. This will ensure the amplifier is protected in future transport. In the unlikely event you have a problem and must return it for service *you must* use the proper packing material. Ship the amplifier only in the original packing material, as the unit is not insurable by carriers otherwise.

Installation (see rack mounting section if applicable)

Ventilation. The most important installation consideration is ventilation. The 9BSST is a convection-cooled amplifier. Unrestricted air-flow across its heat sinks is a must. For this reason do not install anything directly above it. Allow 3.5" (2u) to 5" (3u) inches of space above and to the sides of this amplifier. Do not install directly above other heat generating equipment. Should your installation conditions be constricted, then additional forced air-cooling may be necessary. Bryston can provide an optional fan package if required. Any 9BSST channels thermally shutting down during operation indicates insufficient cooling, and a remedy must be found for cooling the amplifier. Provide a minimum 6" space to the rear of the 9BSST for ventilation and dressing cables to and from the amplifier.
Never operate the 9BSST in a vertical position.

Wiring the 9BSST (also see rear panel description)

S*peaker wires* should be as short as practical. Use quality wire, and if runs are more than 3 meters use at least 12 gauge wire. The speaker binding posts will accept wire up to 3 gauge in size. Bryston can custom build cables for your application.

A/C power

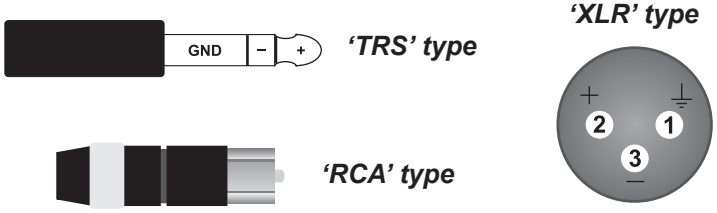
Before plugging in the power cord be sure your 9BSST is specified for the ***correct A/C voltage*** for your locality. The voltage is listed to the right of the power input connector. The circuit feeding the 9BSST should be sufficient so as not to cause the circuit breaker to trip. Note: the 9BSST when operated with all channels at maximum power into 4 ohm loads, can consume all the available power in a normal household circuit, therefore a dedicated electrical circuit may be necessary with this situation. Never lift the safety ground to the amplifier or remove the ground pin from the plug.

Power line conditioners *will not* improve the 9BSST performance, in fact most of the time they restrict the flow of current in the power line to the amplifier, reducing performance at high output levels.

Rear Panel Input / Output Connections

1. Input Select Switch.
Each 9BSST channel gives the user the option of switching between either balanced input or single ended input.

2. Balanced Input connector. (Imp. 20k)
This input connector accepts standard 'XLR' or 1/4" TRS .
Use quality, 100% shielded cables with *gold plated* connectors.



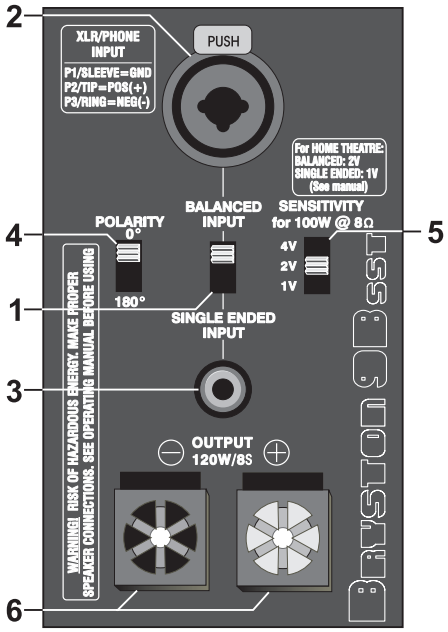


Fig 1

3. Single Ended Input. (Un-balanced input) (Imp. 50k)
This input connector accepts standard 'RCA' or 'Phono' connectors.
Use quality, 100% shielded cables with *gold plated* connectors.

Balanced input Vs Single ended input:
The balanced input requires a balanced pre-amp source. Balanced systems provide noise protection from external electrical interference, so cable length can be very long (50m or longer).
The single ended or unbalanced input is provided for pre-amps without balanced output. Single-ended cables should be kept to 20' (7m) or less. In general never use longer cables than necessary, never coil excess cable length, and run signal wires away from AC power or speaker cables.

4. Polarity Switch (0 or -180 degrees)
Each 9BSST channel gives the user the option of inverting the polarity of the input signal -180 degrees.
Polarity inversion is application specific. *The normal operating position is **0** degrees.*

5. Input Sensitivity (Gain) Switch.
The optimum gain setting will depend upon the source pre-amp operating level, and or personal preference.

The 1v setting is used when the source is *single-ended*, or from a transformer coupled *balanced* source.
This is the ***home theatre*** setting for *single ended* or un-balanced operation.
The 1v setting provides the most amplifier gain - 29 dB. (1v in = 100w @ 8 ohms.) (noise -110 dB)
A signal level of *1.1v* at the input is required to deliver 120W into 8 ohms (rated output).

The 2v setting is used when the sources output is actively *Balanced*.
This is the ***home theatre*** setting for balanced operation Or use this setting with any systems where the volume control rotation is limited to the bottom half of the control or less.
The 2v setting provides an amplifier gain - 23 dB. (2v in = 100w @ 8 ohms.) (noise -112 dB)
A signal level of *2.2v* at the input is required to deliver 120W into 8 ohms (rated output).

The 4v setting is used when the source pre-amp has a high output level, or in ultra sensitive systems where the volume control rotation range is still limited when using the 2v setting.
Some pre-amps may be unable to deliver enough level to use this setting.
The 4v setting provides an amplifier gain - 17 dB. (4v in = 100w @ 8 ohms.) (noise -115 dB)
A signal level of *4.4v* at the input is required to deliver 120W into 8 ohms (rated output).

The noise is referenced in dB below rated output of 120 watts. Different input configurations result in slightly different noise readings. The above noise ratings represent minimum readings, actual readings may be better.

6. Output binding posts

The **RED** binding post is connected to the ***amplifier output***. Connect to this post the (+) terminal on the loudspeaker.
The **BLACK** binding post is connected to ***signal ground***. Connect to this post the (-) terminal on the loudspeaker.

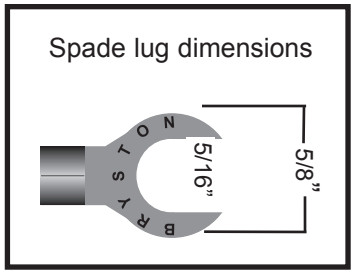
When the **polarity** switch is set for **0** degrees (**normal** operation) the output at the **RED** binding post is ***in phase*** with the input signal.
When the **polarity** switch is set for **180** degrees (**inverted** operation) the the output at the **RED** binding post is 180 degrees out of phase with the input signal.

The Output binding posts provide three different interconnect options. Combinations may be used when bi-wiring. See figure 2 below. Cables should be kept as short as practical and should never be terminated with connectors that may become confused for AC power connectors. Cables should be dressed away from input and power cables.

1. *Banana plugs* offer a quick disconnect option. Before inserting a banana plug into the binding post be sure to tighten the post nut to avoid rattling and to provide full insertion of the banana plug. Gold plated locking banana plugs are available from Bryston.

2. *Spade lugs* provide high contact area and secure fastening. Lugs should be gold plated. See diagram for details.
Post diameter is 5/16' (8mm),lug width 5/8" (16 mm). Gold plated spade lugs are available from Bryston.

3. *Stripped bare wire* up to 3 gauge can be inserted through the hole in the binding post and held in place by tightening the post knob. Additional tightening pressure can be achieved using the wrench provided in the slots of the knob. Do not over tighten or the binding post may become damaged. Note that copper wire is malleable and may require further tightening after the initial installation.



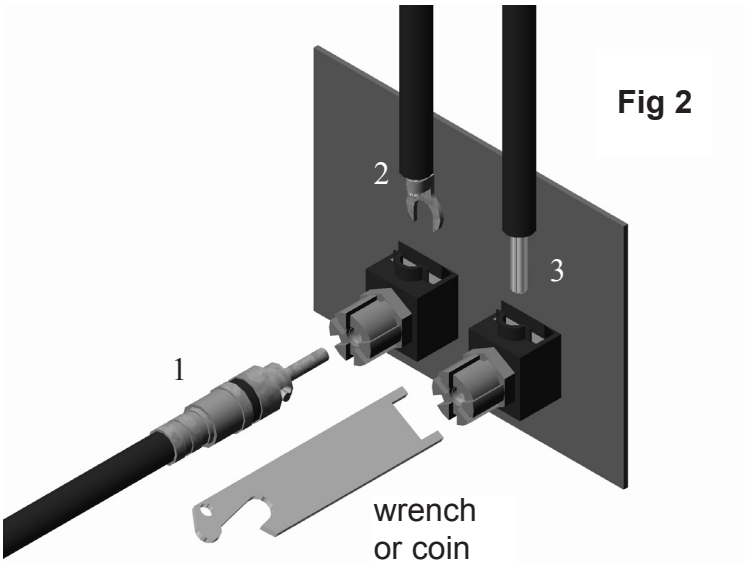
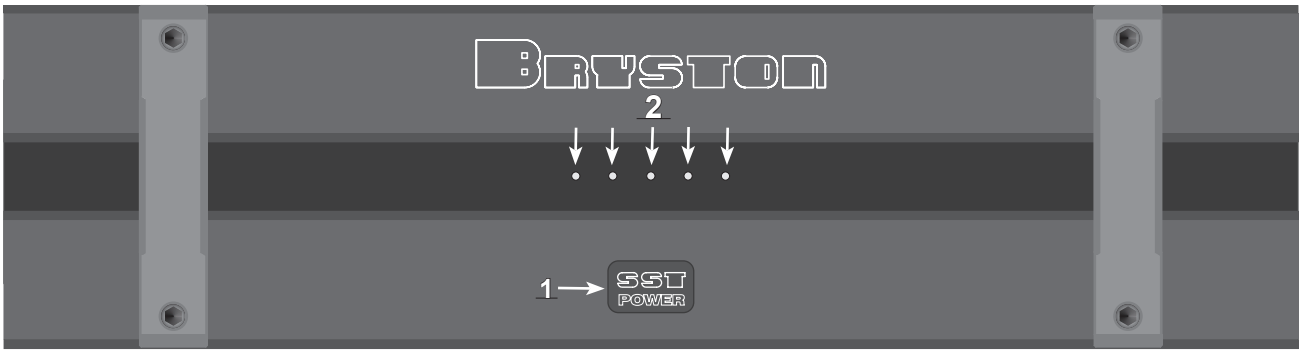


Fig 2



Front Panel

1. 'SST POWER' switch

The front panel label 'ST POWER', is a touch sensitive membrane switch used to apply or remove A/C line power to the 9BSST circuitry. Push firmly the center of the switch until the power-up sequence begins. Push again and the 9BSST will power-down. (Note: the rear circuit breaker must be on for the 9BSST to power-up)

2. LED Indicators

Each 9BSST channel has a LED indicator to monitor the following conditions:

UNLIT -	indicates channel has no power.
RED -	indicates channel is muted (power-up-down sequence)
GREEN -	indicates channel operation is normal.
FLASHING RED -	indicates channel clipping.
ORANGE -	indicates channel thermal shutdown.

Power up sequence

After pushing the 'SST POWER' switch, each channel led will turn from unlit to red (mute). When the power supplies have stabilized the channel will come out of mute and the led will change to green (normal operation).

Unlit led (No power)

The 9BSST channel led when unlit indicates no A/C mains power is present at the channel. If all channel led indicators are unlit the 9BSST probably needs only to be powered on. A single led not lighting possibly indicates blown channel fuses.

When checking fuses switch off the circuit breaker on the rear panel, or unplug the power cord. Use only the specified quick-acting 4 amp 250V 5mm x 20mm fuses. See page 6 for the fuse locations.

Clipping (flashing red)

Clipping occurs when the channel output level no longer can follow the level increase at the input (Over driven input condition). When a 9BSST channel is driven into clipping the channel led will change from green to red then back to green when the level is reduced (Flashing Red). Momentary clipping can be tolerated, however it indicates that maximum undistorted power has been surpassed and potential speaker damage may result if overload conditions persist. Any amplifier that is constantly operated into clipping indicates a more powerful amplifier is needed for that application.

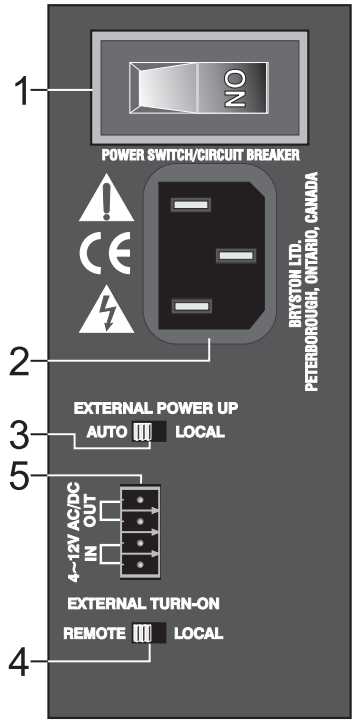
Thermal Shutdown (orange)

The 9BSST channel has thermal shutdown circuitry to prevent damage due to overheating.
Should thermal shutdown occur, the channel will mute, and the channel led will turn orange indicating this condition.
When the channel has cooled to a safe operating condition the channel will return to normal operation.
Persistent Thermal shutdown indicates steps need to be taken to increase airflow across the channel or channels heat sink. (Also see installation section on ventilation).

REAR POWER ENTRY PANEL

1. Master circuit - breaker.

The 9BSST uses a magnetic-trip circuit breaker (1) to protect the amplifier.
This switch should be 'OFF' when installing the 9BSST. When switched 'OFF' all A/C power is removed from the amplifier, including standby power.
The circuit breaker is not the day to day power switch and should be switched and left 'ON' after the installation is complete.Use the 'ST POWER" switch or an external control voltage to Power-up or Power-down the amplifier.
Should the breaker trip, lower or remove the amplifier input signals. Switch the breaker to the 'ON' position. Then power the unit up normally. *The circuit breaker must be 'ON' at all times for the 9BSST to operate.*



2. AC power input.

This is a high current plug for the power cord receptacle. Check that the voltage rating at the right of the connector conforms with your locality. With the circuit breaker 'OFF' insert the power cord into the 9BSST, then plug the other end to an approprate A/C power outlet.

3. Power-Up (Local / Auto switch.)

A. In "Local" position either the front panel 'ST POWER" switch or an external voltage controls the power-up of the 9BSST.
B. "Auto" is used when the 9BSST is powered from a switched power outlet. The 'ST POWER' switch and / or control voltage will function normally after the initial power up.

4. External control voltage power up (Local / external switch.)

A. To power-up the 9BSST using an external control voltage,
Supply a 4v to 12v A/C or DC control voltage to the 'IN' terminals of connector (5).
Use paired wire of 22 gauge to 18 gauge sufficient in length between the source device and the 9BSST. (see 'W')
Select switch (**4**) to "**External**". The amplifier will now power-up only when the control voltage is present (on).
Immediately following power up, the control voltage will appear at the 'OUT' terminals of connector (5) for the control of other equipment.The Removal of the control voltage (0v) causes the 9BSST to turn 'off' and the control voltage at the 'OUT' terminals is interrupted.

B. In the"**Local**" setting of switch (**4**) the 9BSST will ignore the control voltage, and power up only by using the front panel 'ST POWER' switch, or as in section 3 above. If a control voltage is present at the 'IN' terminals it will still be available at the 'OUT' terminals after the power-up sequence.

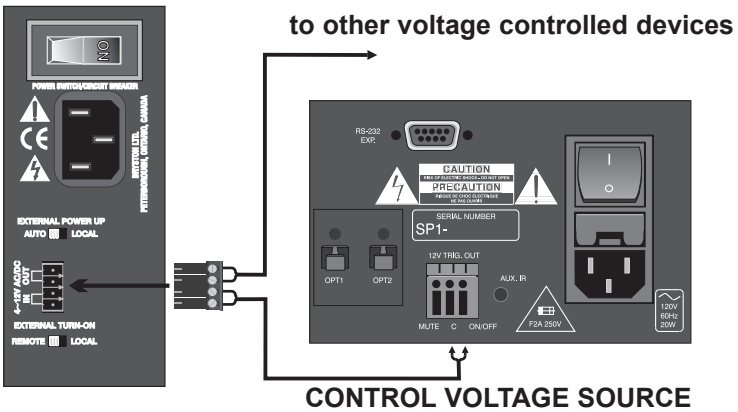
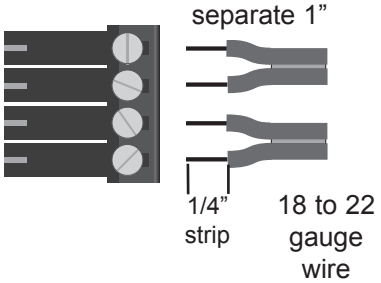


figure W

Control voltage wire preparation for screw terminal connector



Note:
The 'OUT' terminals are connected to the 'IN' terminals once the 9BSST has powered-up.
The control current is determined by the **source** equipment. The carrying current of the 'OUT' relay is 2 amps.
The 9BSST itself draws less than 2 mA from the control current when operating.

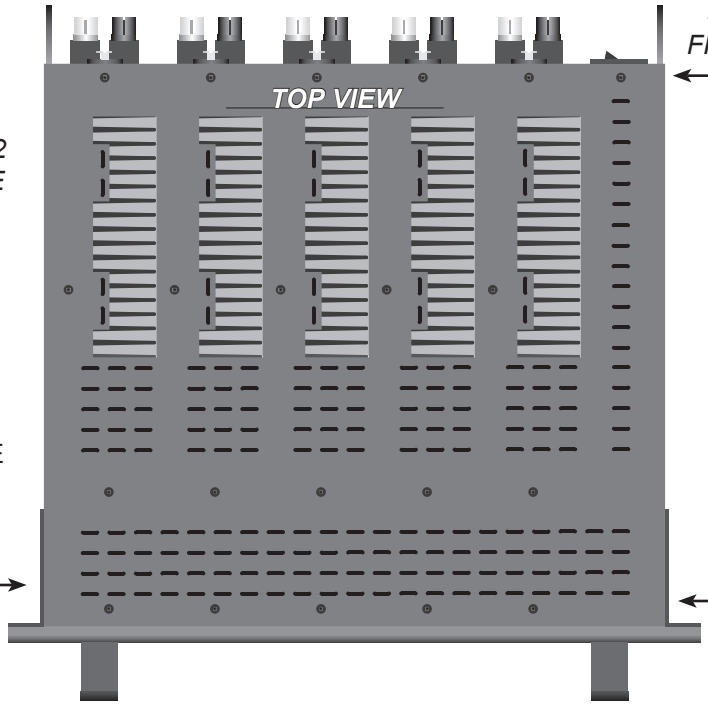
Rack Mounting Instructions

The 9BSST 19" version may be rack mounted with or without the ability to remove the channels. If removal of the channels is desired then the shipping screws securing the channels need to be removed.

REMOVE 4 6-32 SCREWS FROM THIS SIDE →

REMOVE ALL 6-32 SCREWS ON THE TOP

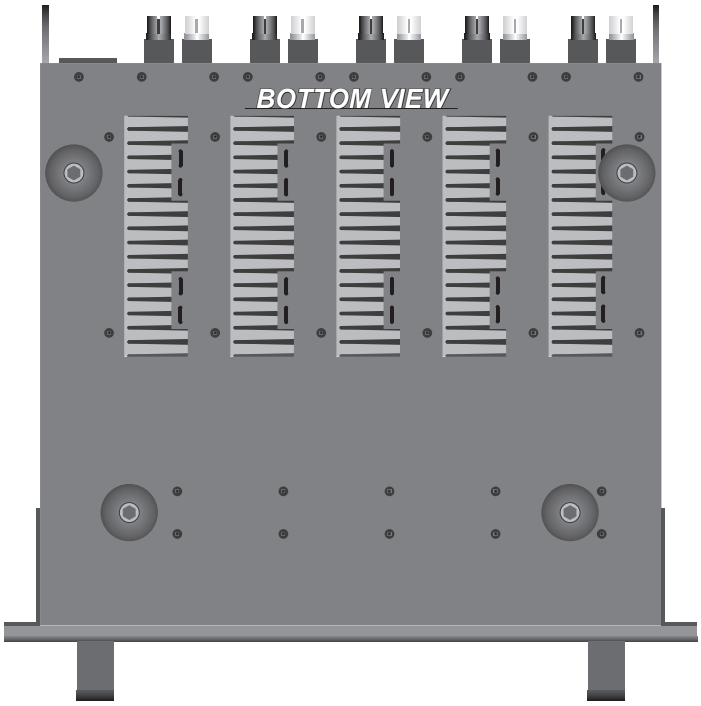
DO NOT REMOVE SCREWS FROM RACK MOUNT BRACKET →



REMOVE 3 3-32 SCREWS FROM THIS SIDE ←

Removing the channels makes rack mounting far easier as the chassis will be much lighter. Before removing any screws from the 9BSST be sure the power cord is removed from the unit. Remove the screws indicated on the top and bottom views plus the ones described on the sides.Pull gently on the channel handle to remove the channel. Be prepared to use both hands to handle the channel. It should not be necessary to remove the power input module.Install 9BSST chassis in rack. Carefully reinstall the channels.

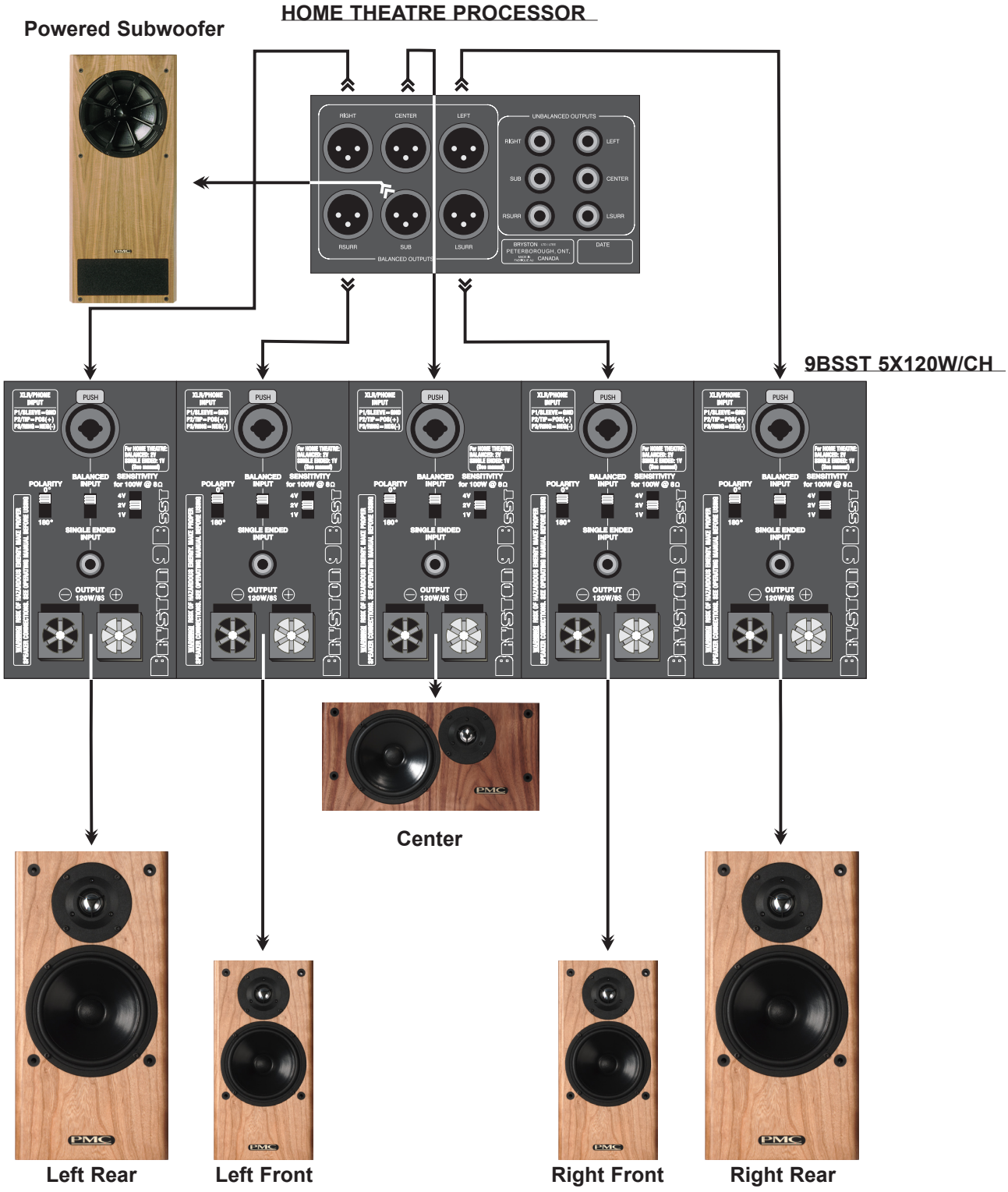
← **DO NOT** REMOVE SCREWS FROM RACK MOUNT BRACKET

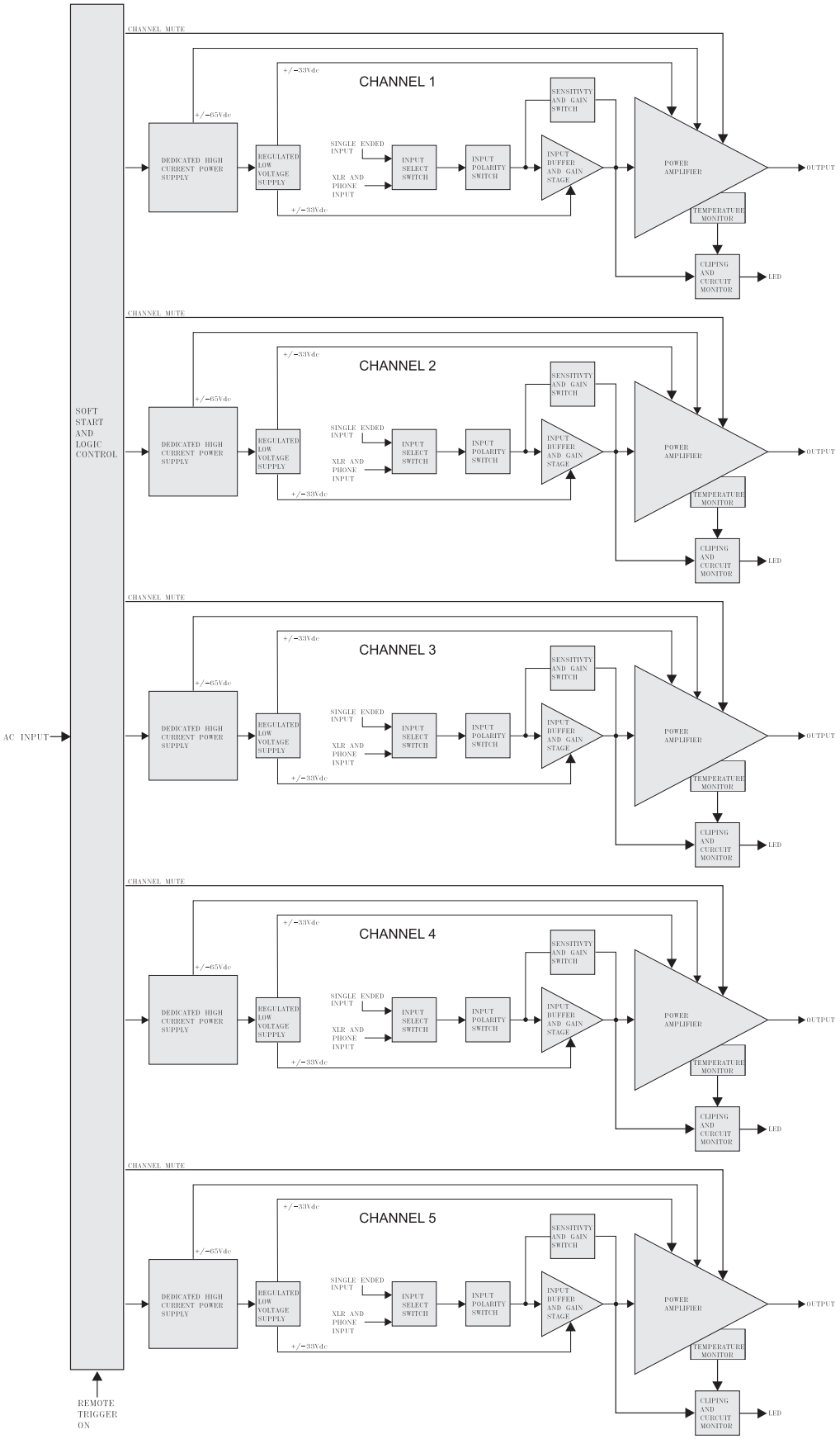


REMOVE ALL 6-32 SCREWS ON THE BOTTOM.

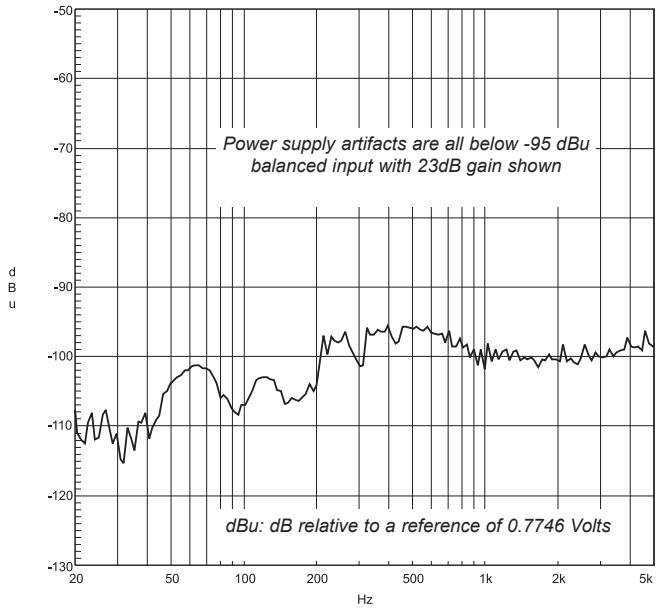
The removal of the feet should not be necessary as clearance below the amplifier *MUST* be at least 1U when rack mounting.

Typical 5.1 Home Theatre Setup

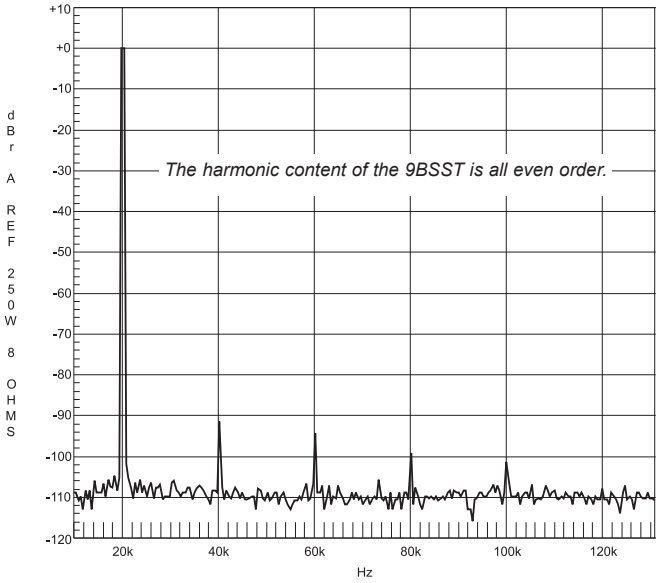



AC INPUT
SOFT START AND LOGIC CONTROL
REMOTE TRIGGER ON
CHANNEL MUTE
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
CHANNEL 5
+/−33Vdc
+/−65Vdc
DEDICATED HIGH CURRENT POWER SUPPLY
REGULATED LOW VOLTAGE SUPPLY
SINGLE ENDED INPUT
XLR AND PHONE INPUT
INPUT SELECT SWITCH
INPUT POLARITY SWITCH
SENSITIVTY AND GAIN SWITCH
INPUT BUFFER AND GAIN STAGE
POWER AMPLIFIER
OUTPUT
TEMPERATURE MONITOR
CLIPING AND CURCUIT MONITOR
LED

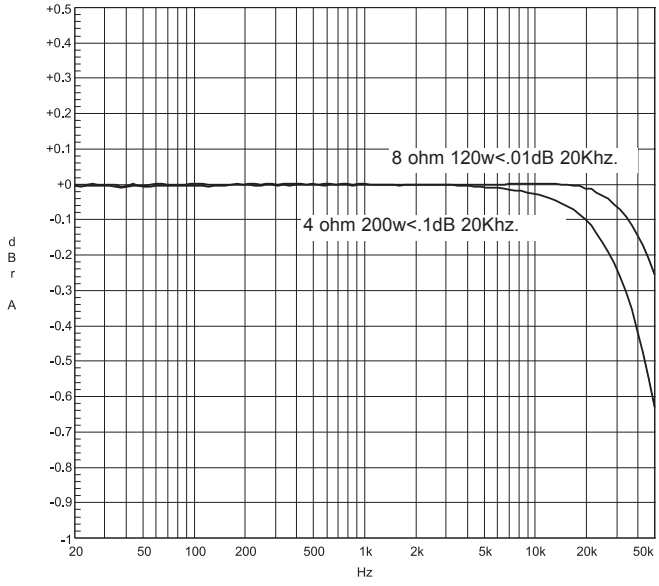
Typical Band-pass Noise


Power supply artifacts are all below -95 dBu
balanced input with 23dB gain shown
dBu: dB relative to a reference of 0.7746 Volts
dBu
Hz

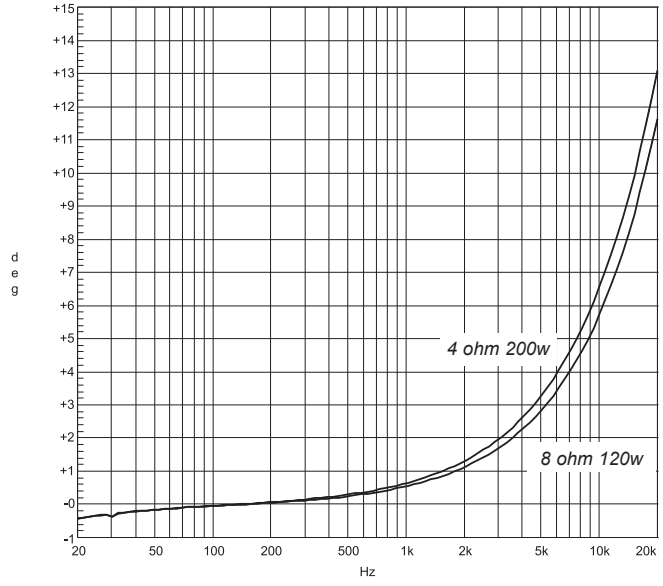
Typical THD+N Harmonic Content



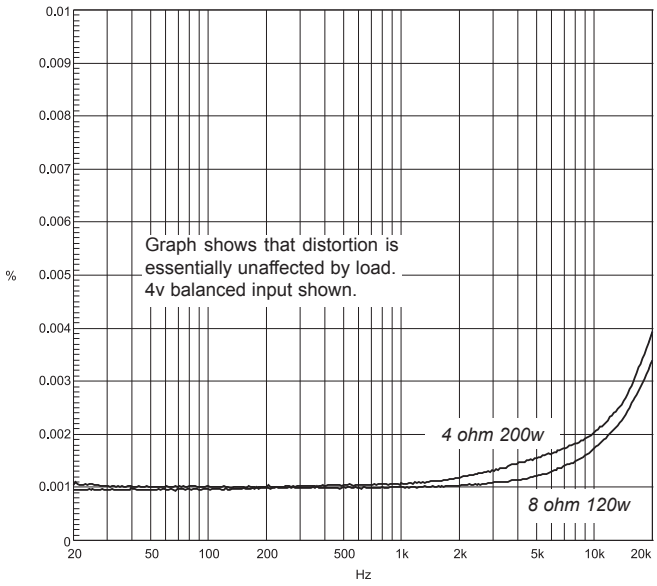
Typical Frequency Response



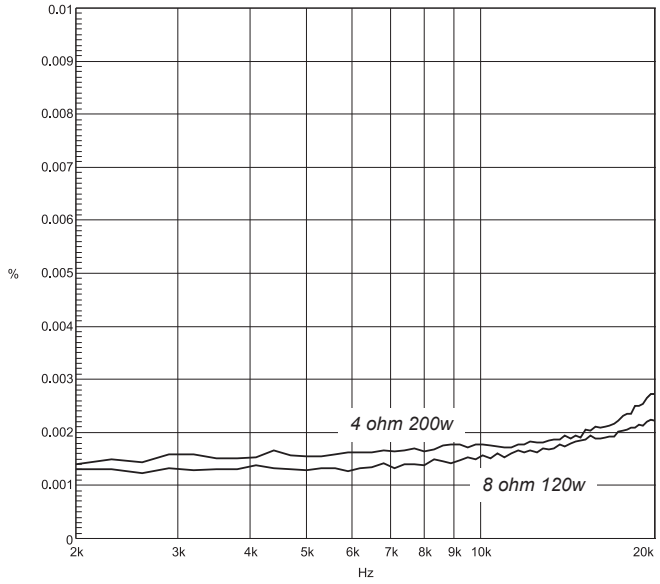
Typical Phase Response



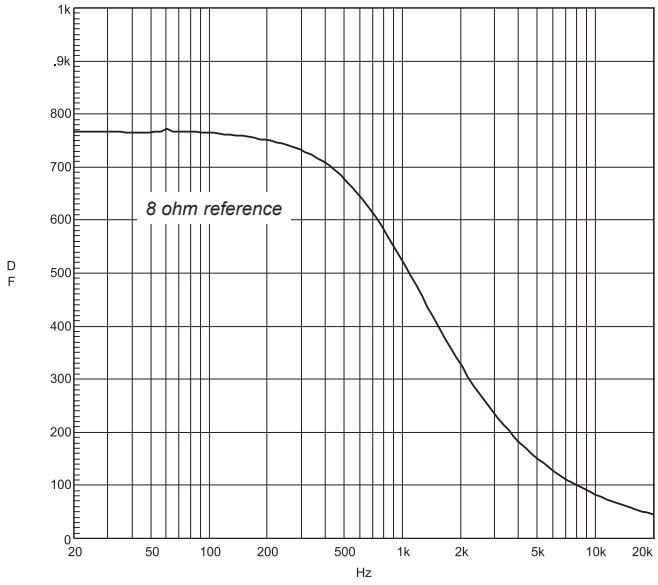
Typical THD+N Sweep



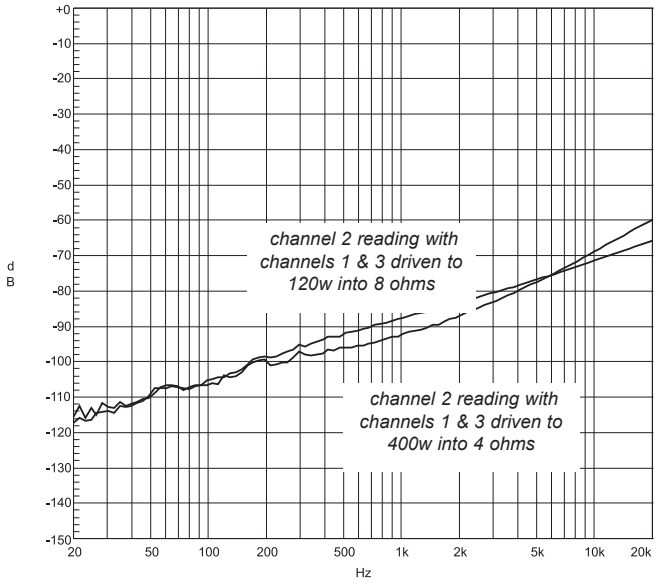
Typical IMD Sweep



Damping Factor



Typical Crosstalk



Technical Specifications

Power Output	120 watts per channel into 8 ohms 200 watts per channel into 4 ohms
Gain Select and Sensitivity	29dB - 1.1Vin = 120W @ 8 Ohms - (1V Position) 23dB - 2.2Vin = 120W @ 8 Ohms - (2V Position) 17dB - 4.4Vin = 120W @ 8 Ohms - (4V Position)
Input Impedance	50 Kohms single ended 20 Kohms balanced
Distortion ***IM or THD+noise***	< 0.005% 20Hz to 20kHz at 120 watts into 8 ohms, < 0.007% 20Hz to 20kHz at 200 watts into 4 ohms
Noise	Measured with input shorted - 20Hz to 20kHz. >110dB below rated output 29dB gain (- 73dBu) >113dB below rated output 23dB gain (- 76dBu) >116dB below rated output 17dB gain (- 79dBu)
Slew Rate	>60 volts per microsecond
Power Bandwidth	<1 Hz to over 100 kHz
Damping Factor	Over 500 at 20 Hz, ref. 8 ohms
Dimensions Rack mount version	48.3 x 13.3 x 48.3cm - 19” x 5.25” x 19“ with handles - mounted rack depth - 43.2cm - 17"
17” version_	43.2 x 13.3 x 44.5cm - 17” x 5.25” x 17.5“
Weight:	approx. 28kg - 62 lbs

Power Consumption &Heat Load

single channel 120W @ 8 ohms -	242 Watts
5 channels @ 120W @ 8 ohms -	1397 Watts
Max. Heat Dissipation 8 ohms -	2720 Btu/Hr.
single channel 200W @ 4 ohms -	422 Watts
5 channels @ 200W @ 4 ohms -	2295 Watts
Max. Heat Dissipation 4 ohms -	4420 Btu/Hr.
At Idle -	192 Watts

IMPORTANT SAFETY INSTRUCTIONS

The lightning flash with arrowhead symbol within an equilateral triangle, is intended to alert the user to the presence of un-insulated "dangerous voltage " within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.
DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, ARE PLACED ON THE EQUIPMENT.
TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE.
THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE.

BRYSTON LIMITED WARRANTY

Bryston analog audio circuits are warranted to be free from manufacturing defects for twenty (20) years from the original date of manufacture. The warranty includes parts and labour.
Bryston Digital circuits and cables are warranted for five years from the original date of manufacture. The warranty includes parts and labour.
Bryston products having motorized moving parts, excluding motorized volume controls, are warranted for three years from the original date of manufacture. The warranty includes parts and labour.
Bryston will remedy the problem by repair or replacement, as we deem necessary, to restore the product to full performance. Bryston will pay shipping costs one way (usually the return portion) during the first three years of warranty coverage.
In the event of a defect or malfunction, contact Bryston's repair centers for return authorization. Products must be returned using original packaging material only. Packing material may be purchased from Bryston if necessary. This warranty is considered void if the defect, malfunction or failure of the product or any component part was caused by damage (not resulting from a defect or malfunction) or abuse while in the possession of the customer. Tampering by persons other than factory authorized service personnel or failure to fully comply with Bryston operating instructions voids the warranty. This warranty gives you specific legal rights and you may also have other rights which may vary from province to province and country to country.
As of 2006-02-22 Bryston will only warranty Bryston products purchased through authorized Bryston dealers. Bryston products with a date code of 0608 or higher (date code format is "yyww", where "yy" is the two least significant digits of the year and "ww" is the week of the year) must be accompanied by a copy of the bill-of-sale from a Bryston authorized dealer to qualify for warranty service. The warranty is transferable from the original owner to a subsequent owner as long as a copy of the bill-of-sale from the original authorized Bryston dealer accompanies the re-sale. The copy of the bill of sale to any subsequent owner need ONLY include the Name of the Bryston Authorized Dealer and the Model and Serial number of the Bryston product The warranty will only be honored in the country of the original purchase unless otherwise pre-authorized by Bryston.

BRYSTON SERVICE in CANADA:

Postal address: **P.O. BOX 2170, Stn. Main**
PETERBOROUGH, ONTARIO
CANADA K9J 7Y4

Courier address: **677 NEAL DRIVE**
PETERBOROUGH, ONTARIO
CANADA K9J 6X7

PHONE: 705-742-5325
FAX: 705-742-0882
E-mail: cdnser@bryston.ca

BRYSTON SERVICE in the USA:

79 COVENTRY ST., Suite 5
NEWPORT, VERMONT
U.S.A. 05855-2100

PHONE: 802-334-1201
FAX: 802-334-6658
E-mail: usaser@bryston.ca

BRYSTON SERVICE outside Canada and the USA:

contact your local distributor *or*

CHECK OUR WEB SITE: www.bryston.ca
E-MAIL BRYSTON DIRECTLY: cdnser@bryston.ca
FAX BRYSTON DIRECTLY: 01-705-742-0882
PHONE BRYSTON DIRECTLY: 01-705-742-5325